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Converting Factors For Stacked Wood

(Revised)

Though the "cord" is used as a standard unit of measure for stacked wood, there is much confusion as to what a cord is and how it can be properly converted to other units of measure. The amount of solid wood in a pile varies greatly depending on the size, straightness, and evenness of the material in the pile, and also on the closeness of stacking.

> THIS Note has been revised because the factor reported for converting peeled round cords into rough round cords was found to be too small.

Fuelwood, chemical wood, and pulpwood are usually sold by the cord, but wood so used is not uniformly piled. The bark may be on or off; and in the Northeast the bolts may be 48, 50, 52, or 60 inches long. In common usage, the cord measure is used without much discrimination, although in contracts it is customary to use the term "unit" for bolt lengths other than 48 inches. The terms "rough" and "peeled" are used to indicate whether the bolts are piled with the bark on or off.

In an attempt to reduce this confusion, we have developed factors for converting from one unit of measure to another (table 1). The basic observations came from a study made in cooperation with the Armstrong Forest Company of Johnsonburg, Pa., and the Allegheny National Forest. The following average factors were obtained from dot-grid counts[*] on stacked wood:

Standard cord of stacked wood	Cubic feet of solid wood
Unsplit, rough	86.38
Split, rough	76.88

These two factors are observed values, and they are subject to measurement and sampling errors that could materially af-

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[*]Keepers, C.H. A new method of measuring actual volume of wood in stacks. Jour. Forestry 43: 16-22. 1945.

TABLE 1--.Conversion factors for stacked wood

Conversion: TO → FROM ↓	Standard cord				Unit with 50-inch bolts				Unit with 52-inch bolts				Unit with 60-inch bolts				Cubic feet	
	Rough		Peeled		Rough		Peeled		Rough		Peeled		Rough		Peeled			
	Round	Split	Round	Split	Round	Split	Round	Split	Round	Split	Round	Split	Round	Split	Round	Split	Solid wood	Gross
Standard cord — Rough Round	1.00	1.12	0.90	1.01	0.96	1.08	0.86	0.97	0.92	1.04	0.83	0.93	0.80	0.90	0.72	0.81	86.38	128
Rough Split	.89	1.00	.80	.90	.85	.96	.77	.86	.82	.92	.74	.83	.71	.80	.64	.72	76.88	
Peeled Round	1.11	1.25	1.00	1.12	1.07	1.20	.96	1.08	1.03	1.15	.92	1.04	.89	1.00	.80	.90	96.00	
Peeled Split	.99	1.11	.89	1.00	.95	1.07	.85	.96	.91	1.03	.82	.92	.79	.89	.71	.80	85.45	
50-inch bolts — Rough Round	1.04	1.17	.94	1.05	1.00	1.12	.90	1.01	.96	1.08	.87	.97	.83	.94	.75	.84	89.98	133-1/3
Rough Split	.93	1.04	.83	.94	.89	1.00	.80	.90	.86	.96	.77	.87	.74	.83	.67	.75	80.08	
Peeled Round	1.16	1.30	1.04	1.17	1.11	1.25	1.00	1.12	1.07	1.20	.96	1.08	.93	1.04	.83	.94	100.00	
Peeled Split	1.03	1.16	.93	1.04	.99	1.11	.89	1.00	.95	1.07	.86	.96	.82	.93	.74	.83	89.01	
52-inch bolts — Rough Round	1.08	1.22	.97	1.10	1.04	1.17	.94	1.05	1.00	1.12	.90	1.01	.87	.97	.78	.88	93.56	138-2/3
Rough Split	.96	1.08	.87	.97	.93	1.04	.83	.94	.89	1.00	.80	.90	.77	.87	.69	.78	83.29	
Peeled Round	1.20	1.35	1.08	1.22	1.16	1.30	1.04	1.17	1.11	1.25	1.00	1.12	.96	1.08	.87	.97	104.00	
Peeled Split	1.07	1.20	.96	1.08	1.03	1.16	.93	1.04	.99	1.11	.89	1.00	.86	.96	.77	.87	92.57	
60-inch bolts — Rough Round	1.25	1.40	1.12	1.26	1.20	1.35	1.08	1.21	1.15	1.30	1.04	1.17	1.00	1.12	.90	1.01	107.95	160
Rough Split	1.11	1.25	1.00	1.12	1.07	1.20	.96	1.08	1.03	1.15	.92	1.04	.89	1.00	.80	.90	96.10	
Peeled Round	1.39	1.56	1.25	1.40	1.33	1.50	1.20	1.35	1.28	1.44	1.15	1.30	1.11	1.25	1.00	1.12	120.00	
Peeled Split	1.24	1.39	1.11	1.25	1.19	1.33	1.07	1.20	1.14	1.28	1.03	1.15	.99	1.11	.89	1.00	106.81	
Cubic feet of solid wood	86.4	76.9	96.0	85.4	90.0	80.1	100.0	89.0	93.6	83.3	104.0	92.6	108.0	96.1	120.0	106.8	--	--

fect the converting factors in table 1. We have no basis for saying how widely they apply.

A corresponding factor for peeled round wood is also needed. Bark thickness of northern hardwoods varies from about 4 percent of wood plus bark for beech to nearly 10 percent for ash. In terms of volume in a bolt of wood, the range is from 8 to 25 percent. In stacked wood, however, there is some compression of bark and some tendency for bark fissures to be filled. H. A. Meyer has used 80 percent of apparent bark area to estimate volume of bark in a stack. In the absence of reliable data, it has been assumed that a cord of round peeled wood contains 96.00 cubic feet of wood; and factors were computed accordingly.

Gross cubic feet per unit was calculated as 128, 133-1/3, 138-2/3, and 160 for 48-, 50-, 52-, and 60-inch bolts respectively. These numbers were combined as products or ratios, using two or more at a time to obtain the entries of table 1. For example, the ratio 86.38/76.88 = 1.12 can be used to convert cords or units (otherwise the same) from round wood to split wood. Or 160/128 = 1.25 can be used to convert units of 60-inch wood to cords of 48-inch wood, other factors being the same. These factors ignore any effect that length of bolt may have on the solid wood content of a stack.

Factors reported in table 1 have been given a careful arithmetic check; yet they should be used with caution until their appropriateness has been more fully established. The wood and piling of this cooperative study may not be representative for other stands with different species or for different standards of stacking.

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